Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554

In the Matter of	**)**	
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Streamlining Licensing Procedures for Small Satellites	**)**	**IB Docket No. 18-86**
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REPLY COMMENTS OF AUDACY CORPORATION

Audacy Corporation ("Audacy"), by its undersigned attorneys, hereby submits reply comments in response to the Notice of Proposed Rulemaking ("Notice") to streamline Federal Communications Commission ("FCC" or "Commission") Rules to facilitate deployment of small satellites.[1] Audacy applauds the Commission's decision to move forward with streamlining rules for small satellites (the "Streamlined Process"). The commercial and scientific satellite community has experienced explosive, unprecedented growth in recent years, driven almost exclusively by small satellites. Diverse and affordable options for building and launching satellites enables both industry stalwarts and start-ups to pursue new business opportunities that would have been impossible or impractical even a decade ago when manufacturer and launch options were limited to a handful of parties. The instant rulemaking and proposed Streamlined Process will help ensure that FCC regulations can accommodate industry growth, and help maintain United States ("U.S.") leadership in small satellite regulation.

[1] *See Streamlining Licensing Procedures for Small Satellites*, Notice of Proposed Rulemaking, FCC 18-44 (rel. Apr. 17, 2018) ("*Notice*").

I. AUDACY STATEMENT OF INTEREST

Audacy was launched in 2015 by a team of Stanford University graduates, National Aeronautics and Space Administration ("NASA") award winners, and Space Exploration Technologies Corp. ("SpaceX") veterans. Audacy's space-based data relay constellation (the "Audacy Network"), licensed under Call Sign S2982,[2] will provide Non-Geosynchronous ("NGSO") spacecraft users with continuous, high-speed, low-latency communications, through the deployment and operation of three Medium Earth Orbit ("MEO") relay satellites and two initial Gateway earth stations ("Gateways"). Audacy's system architecture promotes highly efficient use of spectrum, employing extensive frequency reuse to provide communication to thousands of user platforms simultaneously, easing the burden on not only regulatory authorities but also on satellite operators themselves, who will no longer need to build out extensive ground infrastructure to access to their spacecraft.

Audacy agrees that many new small satellite systems do not fit neatly within the current Part 25 rules (developed before the spread of small satellite technologies and the proliferation of alternative launch vehicles), or Part 5 experimental licensing rules (not intended for longer term or "for hire" services). The Streamlined Process will promote innovation and efficiency by filling the gap in the current rules, and allow small satellite operators to escape the orbit of rules that impose unnecessary operational restrictions or burdensome regulatory fees and filing obligations.

[2] *See Audacy Corporation Application for Authority to Launch and Operate a Non-Geostationary medium Earth Orbit Satellite System in the Fixed- and Inter-Satellite Services*, FCC 18-72, Order and Authorization, IBFS File No. SAT-LOA-20161115-00117 (rel. June 6, 2018) ("*Audacy Grant Order*").

II. AUDACY SUPPORTS THE COMMISSION'S STREAMLINED PART 25 RULES; OFFERS DISCRETE CHANGES TO PROMOTE INNOVATION AND ENSURE FLEXIBILITY

The Commission's Streamlined Process as proposed in the Notice provides a robust foundation that will enable small satellite systems to more expeditiously seek regulatory authority with a light regulatory touch that avoids hindering innovation. Below Audacy encourages the Commission to adopt certain discrete changes to the Streamlined Process to better "future-proof" new small satellite rules.

Number of Spacecraft. The Commission proposes to limit the number of satellites under the Streamlined Process to ten (10) per license and seeks comment on whether to adopt limits on the number of applications an individual satellite operator can file.[3] The initial comments filed demonstrate strong consensus support for the ten-satellite limit.[4] Audacy agrees. Larger, bespoke constellations that require intensive FCC effort to approve and coordinate should continue to avail themselves of the normal Part 25 rules, or, alternatively, seek authority under the Streamlined Process pursuant to a waiver on a case-by-case basis.[5]

Audacy agrees with commenters that oppose limits on the number of applications an individual entity may file under the Streamlined Process.[6] Given the rapid development of small satellite technology, it is reasonable (perhaps likely) that innovative operators may need to develop distinct systems concurrently. Accordingly, capping an operator to one application

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[3] *See Notice* at ¶ 27.

[4] *See Comments of Commercial Smallsat Spectrum Management Association* ("CCSSMA"), IB Docket No. 18-86, at 6-7 (filed Jul. 9, 2018) ("*CCSSMA Comments*"); *Comments of EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC* ("EchoStar/Hughes"), IB Docket No. 18-86, at 3 (filed Jul. 9, 2018) ("*EchoStar/Hughes Comments*"); *Comments of Iridium Communications, Inc*. ("Iridium"), IB Docket No. 18-86, at 4 (filed Jul. 9, 2018) ("*Iridium Comments*"); Comments of Space Exploration Technologies Corp. ("SpaceX"), IB Docket No. 18-86, at 7-8 (filed Jul. 9, 2018) ("*SpaceX Comments*").

[5] For example, the Streamlined Process might be viable for a proof-of-concept network involving a de minimis number of additional satellites over the ten satellite limit, but such decisions should be made by Commission staff on a case-by-case basis.

[6] *See., e.g., CCSSMA Comments* at 7; Comments of Commercial Spaceflight Federation ("CSF"), IB Docket No. 18-86, at 3 (filed Jul. 9, 2018) ("*CSF Comments*").

could limit the utility of the Streamlined Process, or, alternatively, unnecessarily force the creation of separate entities and FCC Registration Numbers ("FRNs") to pursue multiple licenses. The proposed $30,000 application fee remains a sufficient deterrent to spurious or speculative filings.

Planned On-Orbit Lifetime and License Term. The Commission proposes that applicants under the Streamlined Process "certify that the total on-orbit lifetime is planned to be five years or less."[7] Audacy agrees with other commenters who warn that such a limitation may diminish the utility of streamlined Part 25 rules for small satellites given the need to restrict altitude to 400 km or less to ensure atmospheric reentry in five (5) years for satellites without active propulsion.[8] To the extent that the Commission adopts an on-orbit lifetime limit, Audacy urges the Commission to permit an extension of an additional three (3) years with sufficient justification from the applicant.[9] Audacy urges the Commission to align license terms under the Streamlined Process to reflect the proposed revision in on-orbit lifetime, and to toll any license term until such time as the full complement of satellites under a license reaches orbit with up to twelve (12) months of additional time due to verifiable launch delays.

Maximum Spacecraft Size. The Commission proposes 180 kg as the upper limit for spacecraft approved under the Streamlined Process, but seeks comment on a maximum size, including spacecraft up to 500 kg of mass.[10] Audacy views a 180 kg limit for spacecraft mass as reasonable for routine action under the Streamlined Process. Audacy encourages the

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[7] *See Notice* at ¶ 28.

[8] *See., e.g., CCSSMA* comments at 10.

[9] For example, additional on-orbit time may be permitted for satellites with propulsion systems or passive techniques to deorbit spacecraft. A three-year extension still represents a shorter term than permissible under Part 5 rules for licenses that are eligible for renewal. See 47 C.F.R. § 5.71, which permits a 5-year term with justification with the availability of one five-year renewal.

[10] *See Notice* at ¶ 32.

Commission to authorize larger spacecraft on a case-by-case basis under the Streamlined Process subject to compliance with orbital debris analysis and other obligations.

Deployment Orbit and Maneuverability. The Commission proposes that Streamlined Process applicants either certify that satellites will be deployed in an orbit below the International Space Station or by way of the ISS itself (thus ensuring a lower orbit), or, alternatively, if deployed at an orbit above 400 km, that satellites have sufficient propulsion capabilities to perform collision avoidance maneuvers.[11] Audacy agrees with commenters that argue the adoption of such a certification requirement will harm the utility of the Streamlined Process.[12] Under the Part 5 rules today many experimental spacecraft without propulsion are already authorized to operate at orbits above 400 km.[13] Streamlined Process applications involving satellites in orbits above 400 km should be evaluated on a case-by-case basis to ensure the safety of manned spaceflight missions.

Orbital Debris and Collision Risk. The Commission proposes to limit the Streamlined Process to satellites that avoid the release of operational debris,[14] and extends the Part 25 obligation that applicants include a statement that they have assessed and limited the probability of accidental explosions.[15] In addition, the Commission proposes that Streamlined Process applicants certify that individual satellites have a risk of collision with large objects of less than 0.001.[16] Audacy concurs with the Commission's proposal to minimize orbital debris, which represents a significant issue that the FCC and other regulatory bodies will need to address in the near term as smaller satellites launch in larger volumes. Audacy also supports the preparation of

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[11] *See Notice* at ¶ 33-34.

[12] *See, e.g., CSF Comments* at 6.

[13] *See, e.g.,* OET File Nos. 0298-EX-CN-2016, 0477-EX-CN-2018 and 0412-EX-CN-2017.

[14] *See Notice* at ¶ 35.

[15] *See Notice* at ¶ 36.

[16] *See Notice* at ¶ 37.

an Orbital Debris and Assessment Report ("ODAR") as an appropriate showing to demonstrate compliance with orbital debris obligations. Part 5 experimental license filers routinely prepare ODAR reports already, and Audacy agrees with commenters that ODAR reports do not represent a significant burden on the applicant.[17]

III. AUDACY SUPPORTS THE EXPEDITED PROCESS PROPOSED FOR STREAMLINED APPLICANTS, BUT URGES ELIMINATION OF PROCESSING ROUND AND PERFORMANCE BOND OBLIGATIONS

Processing Round Procedures. The Commission proposes to exempt small satellite applicants from processing round procedures but require them to "(a) certify that operations of its satellite will not interfere with those of existing operators, (b) certify that it will not unreasonably preclude future operators from utilizing the assigned frequency band(s), and (c) provide a brief narrative description illustrating the methods by which future operators will not be unreasonably precluded."[18] With respect to the method of certification, the FCC contemplates the "sharing of ephemeris data to avoid RF interference events, use of directional antennas, limiting operations to certain times throughout the day, limiting earth stations operating with the system to certain defined geographic locations, or some combination of these and other means that could be used to accommodate sharing in assigned frequency band(s)."[19]

Audacy enthusiastically lends its support to the commenters that have already encouraged the Commission to exempt small satellites from processing round procedures.[20] Moreover, we urge the Commission to ensure that small satellite customers accessing the Audacy relay network

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[17] *See., e.g., CCSSMA* Comments at 17.

[18] *See Notice* at ¶ 43.

[19] *See Notice* at ¶ 43.

[20] *See, e.g., CCSSMA Comments* at 21.

by way of K-band cross links receive an exemption from processing round procedures.[21] Audacy customers will use a combination of pre-engineered radio equipment and Audacy-provided coordination services, which will ensure the avoidance of harmful interference to other space- and terrestrial-based systems. Audacy may also provide such customers with an exhibit for inclusion in any streamlined application that provides the Commission with verifiable technical methods for interference avoidance. Imposing a processing round upon such customers would be unduly burdensome and unnecessary.

Application Requirements. The Commission seeks comment on whether the Form 312 and Schedule S should serve as the continued basis for applications under the Streamlined Process, but permit certifications to address qualifying criteria.[22] Audacy concurs with the Commission's approach, but also encourages the Commission to make minor adjustments to the Form 312 and Schedule S as appropriate to ensure that orbital parameters and service area plots, both of which will vary over the course of a small satellite's operational life, can be accommodated.

Revised Bond Requirement. The Commission proposes to retain the performance requirement for Streamlined Process applicants, but permit a "one-year 'grace period' during which small satellites that qualify for the streamline process… would not have to post a bond."[23] As other commenters have already expressed, retaining the bond requirement presents serious challenges, and the Commission should eliminate the requirement altogether for Streamlined Process applicants.[24] Emerging new technology companies may be required to make significant

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[21] Audacy is approved to provide ISS cross-link services in the 22.55-23.18 GHz, 23.38-23.55 GHz, 24.45-24.75 GHz, 32.3-33.0 GHz, 54.25-56.9 GHz, 57.0-58.2 GHz, and 65.0-71.0 GHz bands.

[22] *See Notice* at ¶¶ 47-48.

[23] *See Notice* at ¶¶ 49-51.

[24] *See, e.g., CCSSMA Comments* at 21; *CSF Comments* at 6.

cash deposits to collateralize performance bonds.[25] If the performance bond obligation remains intact but tolled for one year, a prospective satellite operator may be required to effectively raise one million dollars, or, alternatively, to surrender its authority and restart the licensing process if there are even relatively modest delays in spacecraft construction or launch vehicle availability. Such a burden may ruin the utility of the Streamline Process for many entities with promising technology. Audacy agrees with other commenters that the $30,000 application fee creates a sufficient safeguard against speculative license applications under the Streamlined Process.[26]

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IV. NO TECHNICAL OR POLICY EXISTS FOR ALLOWING SPACE-TO-SPACE COMMUNICATIONS IN BANDS NOT AUTHORIZED FOR INTER-SATELLITE SERVICE ("ISS")

The Commission seeks comment on using MSS and FSS spectrum to facilitate inter-satellite communications to small satellites."[27] In response to this request SpaceX argues that FSS bands "are already heavily subscribed…," and that '[a]uthorizing an ever-changing assortment of smallsats to operate inter-satellite links using FSS spectrum would further complicate the already challenging coordination environment for NGSO operators with GSO and other NGSO systems."[28] EchoStar/Hughes similarly opposes the initiative, stating that "[p]ermitting [inter-satellite] operations between GSO and NGSO satellites, including small satellites, in other frequency bands that are allocated for "space-to-Earth" or "Earth-to-space" operations (but not space-to-space) is inconsistent with the Commission's rules."[29]

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[25] Up to 100%.

[26] *See CCSSMA Comments* at 25, explaining that the "$30,000 application fee and numerous restrictions and qualifications imposed on applicants, when combined with the inability to use the Streamlined Process for spectrum warehousing, would seem to deter speculative satellite applications."

[27] *See Notice* at ¶ 72.

[28] *SpaceX Comments* at 11-12.

[29] *EchoStar/Hughes Comments* at 7.

EchoStar/Hughes adds that inter-satellite "operations have not been studied by the ITU to properly assess the interference threat posed by the small satellites" to incumbent operations.[30]

Audacy strongly agrees with SpaceX and EchoStar/Hughes, and supports their position that Part 25 authorized satellite-to-satellite communications should occur solely in inter-satellite service allocations for the foreseeable future until such time as the FCC and ITU have comprehensively evaluated the interference potential of space-to-space communications into incumbent services and made appropriate adjustments to international and domestic radiofrequency allocation tables. In particular, Audacy shares serious concerns about the ability to coordinate co-channel small satellite space-to-space communications against geostationary and non-geostationary space-to-ground[31] communications. Operational or approved GSO and NGSO systems, which represent billions of dollars in already sunk investment, were not designed or intended to coordinate their space-to-ground communications against fast moving small satellites transmitting to other satellites in space. Approval of small satellite ISS in co-channel frequencies used by GSO and NGSO systems would represent both an immediate real-world interference threat, and a long-term disincentive to investment in extremely complex and capital intensive satellite networks that require regulatory stability and known, clean spectrum to serve their mission-critical end users.

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[30] *Id.*

[31] In this context, Audacy uses the term space-to-ground communications for uplink and downlink transmissions.

V. CONCLUSION

Audacy appreciates the Commission's continued commitment to nurture an environment conducive to the development of new satellite technologies, and views the Notice as a meaningful step to facilitate a more streamlined and expeditious framework for processing license applications involving small satellite systems under the FCC's Part 25 rules.

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Respectfully submitted,

/s/

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